#38 JD 5k9/2 ED

IN THE UNITED STATES PATENT OFFICE

APPLICANT: William George Wilhelm

SERIAL NO. 08/820,496

FILED: 3/19/97

FOR: HIGH EFFICIENCY LIGHTING SYSTEM

EXAMINER: F. Fleming

GROUP ART UNIT: 2836

SUPPLEMENTARY RULE 56 INFORMATION DISCLOSURE STATEMENT

In order to fulfill the requirements of candor and good faith set forth in 37 CFR 1.56, Applicant submits for consideration by the Examiner this Supplementary Rule 56 Information Disclosure Statement with the enclosed references cited on the PTO 1449 form. A copy of the foregoing references are enclosed.

I US Patents

| Patent No. | Date | Inventor | Class Sub Class |
|---|---|---|---|
| 4,075,504 | 2/21/78 | Gnaedinger | 307/66 |
| 5,532,525 | 7/2/96 | Kaiser | 307/64 |

II Foreign Publications

| Document No. | Date | Country | Class Subclass | Translation Yes/No |
|---|---|---|---|---|
| JP 06-274233 (Sanyo) | Published 9/30/94 | Japan | H01 M-008/00 | No |
| JP 06-237432 (Tokyo Electric) | Published Sept. 20, 1990. | Japan | H04 N-005/782 | No |
| JP 62-254626 (Meidensha Electric) | Published Nov. 6, 1987 | Japan | H02 J-01/10 | Yes |

JP 06-141533 (Nippon Telegraph) Published May 24, 1994
Japan H02 M 1/10 No

JP 06-327146 (Denryoku) Published 11/25/94. Japan
H02 U 1/00 No

III Other References

(Including Author, Title, Date, Pertinent Pages, Etc.)

NONE

REMARKS

This Supplementary Rule 56 Information Disclosure Statement is made because of recent examination reports in related applications in Australia and China.

In Australia, the Patent Examiner cited the five above noted Japanese references, as well as the Kaiser '525 reference, in an examination report dated December 12, 2001.

In China, the Patent Examiner cited the Gnaedinger '504 reference, in an examination report dated January 4, 2002.

In general the five Japanese references are directed to stabilizing voltage on the load side, and many send excess power through bi-directional inverters to an AC power source, to avoid large fluctuations in voltage that are detrimental to DC loads, such as lighting fixtures.

In contrast, the present invention is based upon "power sharing", using voltage regulation to control voltage to control power to a buss by differentiating the voltage of one or more power supplies, as a means to control current from one or more power supplies to the loads.
Concerning the prior art of Gnaedinger '504 cited against the Claims, please note that Gnaedinger '504 does not

produce voltage regulated DC electrical power as a means of control which is the essential function in the Applicant's applications for optimizing power transfer.

For example, unlike the present invention, Gnaedinger `504 describes a power supply apparatus for a recreational vehicle which does not filter or voltage regulate the DC power derived from the AC connection.

In contrast to the present invention, Gnaedinger `504 is concerned with the rating of the transformer therein so as to create a priority between the loads "L1-L4" and charging the DC battery. In periods of high demand, the battery charging is interrupted denying any proportional sharing of power in order to mitigate fractional power peaks.

Also in Gnaedinger `504, the loads "L1-L4" can use full wave rectified AC unfiltered without the regard Applicant herein placed on having such load exposed to a specific and controllable regulated voltage. Applicant's essential voltage regulation is shared by a parallel connection of power sources with the regulated voltage having a critical impact on the management of storage and the maximum power collection point for alternative power generators.

Furthermore, in Gnaedinger `504 load "L5" is a special load requiring pure DC electrical power which is handled separately.

In addition, in Gnaedinger `504 the battery is disconnected from loads "L1-L4" during AC connection by

using a mechanical relay demonstration the lack of awareness for the subtleties for electronic power control. Moreover, in Gnaedinger `504, the circuit is of implied small scale device oriented power application domain with no essential emphasis for the efficiency required in the much large building size indicated in Applicant's application.

Also with respect to prior art, please note that an Examiner in a related PCT national phase patent application in Australia has cited US Patent No. 5,532,525 of Kaiser and five Japanese patent publications. The English abstracts for four of these five Japanese documents and one full English language translation of the fifth document are being submitted in the enclosed Rule 56 Information Disclosure Statement and PTO 1449 form.

First, it may be noted that the Japanese Patents also embrace DC power for building power applications. However, it is a very raw system that recognizes that in the Japanese environment there must have been a mix of both new and older DC motor equipment used with direct current electrical power.

It also may be noted that the Japanese Patents also embrace DC power for building power applications. However, the system is primitive, since it is addressing the former DC building environment common to the age of Edison over one hundred years ago. The DC buss arrangement attempts to address the mix of both new and older DC motor equipment

common to a the post war environment where much direct current electrical was present.

In general, the five Japanese references cited in Australia are directed to efforts to stabilize older DC building voltages. This is accomplished by dumping excess DC power by loading it down through an inverters to an AC it to the more common AC line. This crude method of avoiding large fluctuations in DC voltage is directed to a much older historical domain and its problems, with only incidental similarities to the Applicant's invention.

In contrast, the present invention addresses optimal "power sharing". It uses regulation voltage control to control and extraction power by differentiating the voltage of one or more power supplies against another.

With regard to the five Japanese documents, please also note the following:

JP 06-274233 (Sanyo)
Published 9/30/94

This uses photovoltaic PV power supplies, which are variable, but it has no way of controlling power sharing. The circuitry uses a line inverter to dump excess energy from the DC power supplies to the AC power source. This is because if voltage is too variable, the buss will be unstable. If load can't absorb DC supply, it directs excess

power to AC. If DC power is excessive, the excess DC supply from generators or PV are converted to the power to AC power line. The existence of multiple DC sources are incidental and do not indicate "power sharing" as the Examiner asserts. The diode isolation in this Japanese patent is not unique. The Japanese reference is a voltage regulating system on the load side, (preventing damage to DC loads by excess DC power as a safety factor) instead of regulating voltage on the supply side as in the pending patent application of Applicant. In contrast to the Japanese art, Applicant uses voltage to optimize power from the power supply.

This Japanese patent omits the means, or the description of a means, for addressing the intrinsic voltage and current variability of the indicated photovoltaic PV power supplies. The Japanese patent implies that such a function is unimportant or obvious, which is not the case. The circuitry that uses a line inverter to dump excess energy from the DC power supplies to the AC power source. If this is the way that the Japanese technology of is used to compensate for solar variability than the point is not articulated as to purpose of the invention. Further the patent does not relate the essential specific voltage control such as peak power point optimal PV power extraction. More likely it merely treats the broad nature of intrinsic DC source without regard to power management.

The implications of "power sharing" may not be an essential part as the Examiner asserts. Furthermore the

diode isolation in this Japanese patent is not unique since that is one of the intended functions of the generic diode. An exception occurs when a specific functional purpose of the "diode biasing voltage" is implied other than pure isolation.

The Japanese reference is a voltage regulating system on the load-side which appears directed to avoiding DC load damage as in, over or under voltage, as opposed to the more subtler power control in the pending patent application of Applicant. Unlike the technology of Applicant, it cannot be assumed this Japanese patent uses regulated voltage control to optimize power from various power supplies.

JP 06-237432 (Tokyo Electric)
Published Sept. 20, 1990.

This Japanese patent is just a DC buss feeding a lot of variable loads which are associated with inverters converting DC to AC (or to variable cycle AC) to power a variable cycle heat pump of an air conditioner. There is no attempt to use buss load to control power from one source to another, i.e. no power sharing. In contrast, Applicant regulates a power buss to control power to and from the buss. Applicant uses power voltage to control direction of power from variable sources to loads. Buss use in the Japanese patent is different. It just mixes loads to a tie point and not to the buss itself. There is no voltage

control to a common DC tie point as in Applicant's invention.

This Japanese patent can again be tested against the argument made previously since they share a need for a DC power buss. The focus of the application appears to be load specific to a variable speed heat pump (high air-conditioner) which intrinsically requires DC operation. It appears to address the issue "What do you do with all the converter DC when you don't need so much air conditioning"? The answer here is to use it for other functions, to AC and to supply something, to use it to supply un-interruptible power system for something else, etc. It does not seem to address to same goals or function by Applicant, other than share the use of a DC buss, which is a feature in the public domain.

JP 62-254626 (Meidensha Electric)

Published Nov. 6, 1987.

This Japanese patent appears to be similar to the above noted Tokyo Electric patent. It is just a tie point with multiple loads on a buss. In the Japanese patent '626, the summary "B" shows some similarities to Applicant's invention. The wind output is rectified to DC, the fuel cell

and/or solar output is "adjusted in polarity and voltage together with the output of a rectifying device and fed to a direct-current bus bar..." This is done to avoid synchronization and power factor regulation of an AC distribution scheme. In section "D".("Problems to be Solved"), this objective is also shared by Nextek, such as use of direct DC generation from wind and engine generators as opposed to AC generation and then rectification to DC, as noted in Applicant's gas generator in Figure 11.

This Japanese patent has the oldest filing date. Again it is noted that one must address this Japanese patent's lack of uniqueness for using a common DC tie point with multiple loads on a buss. Going further and to insure completeness, a translation was ordered to insure an understanding of the invention and its uniqueness relative to Applicant. What it is important about this Japanese patent is whether in any other case that the language in this Japanese reference, for example, that it "..is adjusted in polarity and voltage together with the output of the rectifying device and fed to a direct current bus bar" constitutes the same level of invention as indicated by Applicant's invention. It is our legal opinion with consultant support that the Japanese statement is simply too vague to indicate the same required level of understanding indicated by Applicant.

The emphasis in sections "F" and "G" of the Japanese '626 patent is on avoiding the synchronization and control

of multiple AC sources. In contrast, in Applicant's system, the emphasis is on sharing multiple power sources to serve primarily a large inherently DC load.

With reference to the Japanese diagram, it is obvious that any control as described in section "G", (Working Example), "and adjusted in output voltage", and is handled in a distributed manner locally controlling each power source as it feeds a common bus. This is distinguished from the central control of source output voltage to perform load shifting and dynamic load sharing by Applicant (see Figure 10 of Applicant's drawings, which shows an internal block diagram of a power controller).

Also, instead of careful charging of the storage battery in Applicant's invention, in the Japanese '626 patent, it is just wired across the "rails" of the "bus bar" (see item "H 6"). Although not explicitly mentioned, the two DC sourced inverters 8 and 9 may be used as a "safety valve" to dump excess bus power to AC mains.

JP 06-141533 (Nippon Telegraph)
Published May 24, 1994.

This is just power conditioner to make AC power into DC power to match buss voltage. It makes unregulated fuel cell voltage constant at the power output. This device is merely an auxiliary to the fuel cell therein, to make its voltage constant relevant to the power buss load side. It is device

specific to a fuel cell, as opposed to any power buss controlling function.

JP 06-327146 (Denryoku)
Published 11/25/94.

This is just a distribution system. It describes a system that does not control power sharing modes. The system ties DC sources and loads together without showing any means for controlling the power. It doesn't differentiate where power is coming from, like in Applicant's system, which can cause one supply to control current from another by altered voltage on one of the supplies. With Applicant's technology, the voltage controlled levels direct power. But there is no load shifting in the Japanese system. Also, no battery is indicated therein. Both Applicant and this Japanese reference use a diode steering network, but diode steering, as expressed earlier, into a buss, is not unique to anyone. In contrast, Applicant uses a voltage regulator to control voltage and to control power to the buss by differentiating the voltage of one or more power supplies, as a means to control current from one or more power supplies to the load or loads.

It is believed that the same arguments can be made for the Kaiser reference.

In view of the art cited, claim 49 has been revised to highlight the distinguishing features of the present

invention. The claim now calls for the three sources of electrical power, the primary source of AC, the alternative primary source of DC, and the secondary source of DC which is defined as a backup in the event of a failure of a primary source of power. The claim recites the sharing arrangement of the two primary sources of power, with the power controller selecting the amount of sharing. It is not believed that any of the references of record, including those described above, teach or suggest this important feature of the present invention. Sharing of the AC and DC power is described in pages 6-7 of the specification and Fig. 10 of the drawings, as well as in other places.

In view of the present submission, it is now believed that the present application is in all respects complete and in condition for examination on the merits.

If the Examiner has an questions or comments relating to the present application, he or she is respectfully invited to contact Applicant's attorney at the phone number set forth below.

Respectfully submitted,

Dated: ~~March~~ May 15, 2002

Alfred M. Walker
Attorney for Applicant
Reg. No. 29,983
225 Old Country Road
Melville, NY 11747
(631) 361-8737

pat56 Supp CPA 2 5-15-02

CERTIFICATE OF MAILING

I hereby certify that the attached correspondence is being deposited with the United States Postal Service as Express Mail No. EV 089601342US addressed to: COMMISSIONER OF PATENTS WASHINGTON DC 20231 on the date indicated below.

Date: May 15, 2002

Alfred Walker